REMARKS

Claims 1-27 are pending in the application. Claim 19 is rejected under the first and second paragraphs of 35 U.S.C. §112, that is, for lack of enablement and for being indefinite. Claims 1-6, 9-10, 15-18, and 20-25 stand rejected under 35 U.S.C. §102 as being anticipated by Worley.[1] In addition, claims 7-8, 11-12, 13-14, and 26-27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Worley. Further, claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Worley in view of Aoki.[2]

Claims 1 and 18-19 have been amended. Claim 12 is cancelled. New claim 28 has been added. In addition, the specification has been amended to address an error identified by the applicant. Correction of this error does not add new matter.

Applicants respectfully traverse the rejections.

1. Amended claim 19 is directed a digital display system, the system including a data processor, an electro-optic display, a display controller, and a camera. Support in the specification for a system including these elements may be found in several places. For example, the specification provides "FIG. 2 shows a block diagram of a typical image display system 10, comprising a host data processor 12, a liquid crystal display controller ("LCDC") 14, and a liquid crystal display 16."[3] In addition, the specification provides "the image to be displayed may be generated . . . by the data processor 12. Alternatively, the image may be supplied by some other source, such as a camera."[4]

Accordingly, it is respectfully submitted that the 112 rejections be withdrawn.

2. Worley teaches a pixel cell having a liquid crystal layer sandwiched between a transparent common electrode and a storage electrode. Depending on its orientation, the liquid crystal layer may rotate the polarization of light passing through it. The degree of rotation is a function of the root-mean-square (RMS) voltage across the electrodes. The intensity of light passing through the liquid

[1] U.S. Pat. No. 6,326,980 to Worley III. ("Worley").
[2] U.S. Pat. No. 5,650,844 to Aoki, et al.
[3] Specification, page 3, beginning at line 28.
[4] Specification, page 4, beginning at line 2.

crystal layer is thus modulated according to the degree of rotation, "which in turn depends on the data signal being asserted on" the pixel storage electrode.[5]

Worley discloses that the pixel storage electrode may be driven "via pulse-width-modulation (PWM). In PWM, different gray scale levels are represented by multi-bit words." In addition, the "time in which a gray scale value is written to every pixel" is referred to as the *frame time*. The frame time is divided into intervals and during each interval either a high or low signal is asserted on the pixel storage electrode.[6] Worley provides an example of a gray scale value of 1010b (10d) in the context of a 4-bit PWM scheme, stating that 1010b corresponds with high pulses in 10 of the 15 intervals of the frame time.[7]

Further, Worley discloses that "each bit of data remains on the appropriate pixel electrode for a period of time dependent on the significance of the bit."[8] In the example of the 4-bit PWM scheme, Worley states that "for the value (1010), the first pulse B3 (*8 intervals wide*) is high, the second pulse B2 (*4 intervals wide*) is low), the third pulse B1 (*2 intervals wide*) is high, and the last pulse B0 (*1 interval wide*) is low."[9] Moreover, Worley discloses an apparatus for modulating the pulse width of each bit. In particular, an output controller 914 causes an LCD "to load the bits asserted on data bus 924 onto the appropriate pixel cells. The loaded data remains on the pixel cells until output controller 914 writes the next bit to the pixel cells, a time controlled by output controller 914 to correspond to the significance of the previously loaded bit."

Describing a "compound data word," Worley notes that "the data need not be written . . . in any particular order, as long as each bit . . . intended for a particular pixel is asserted on that pixel for a portion of the entire frame time corresponding to the significance of the asserted bit."[10]

3. According to the Office Action, Worley anticipate claims 1 and 20 because, in part, the reference teaches a data planarizer. According to Worley, the data planarizer accumulates and reformats pixel data. The reason for the reformatting is so that multiple pixel cells can be simultaneously driven.

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[5] Worley, col. 1, lines 23-51.
[6] Worley, col. 1, lines 54-66.
[7] Worley, col. 1, line 62 to col. 2, line 32.
[8] Worley, col. 11, lines 21-23.
[9] Worley, col. 2, lines 20-23, emphasis added.
[10] Worley, col. 11, lines 50-55.

> "Data planarizer 908 *accumulates* the 10-bit gray scale data for 32 pixels and *reformats* the data into 32-bit data words, each 32-bit word containing one bit from each of the group of 32 10-bit compound data words. For example, the 32-bit word formed by bits P0[0]-P31[0] includes the least significant bits of the compound data words for pixels 0-31. This *reformatting is necessary because each bit* of gray scale data *is written to* micro-*LCD* 928 *32 pixels at a time*."[11]

Applicant disagrees that claims 1 and 20 are anticipated by Worley. Amended claim 1 recites a mode control circuit "to *substitute* for a selected subset of the set of image data words the image data words from one or more contiguous pixels."[12] Claim 20 recites "*substituting* for a selected subset of the set of image data words the image data words from one or more contiguous pixels."[13] Stated differently, claims 1 and 20 contemplate that *the data words from one or more contiguous pixels* are substituted for *a selected subset of a set of data words.* In addition, the claims 1 and 20 clearly contemplate that this substituting results in a "*modified* set of image data words."[14]

The Worley reference does not disclose or suggest substituting one data word for another data word. Reformatting data words is not equivalent to substituting the data words from one or more contiguous pixels for a selected subset of a set of image data words. The effect of the reformatting disclosed in the Worley reference is that 32 pixel data words are clocked in parallel, bit-by-bit, to 32 pixel cells. In other words, serial data words are converted to parallel data words. Worley does not disclose or suggest that a *selected subset* of the 32 pixel data words are replaced with any of the *set* of 32 data words.

Nor does Worley does disclose or suggest that any of the pixel data words in the set of 32 pixel data words are in any way *modified*. Each Worley pixel cell receives pulses within a frame period which correspond with the compound data word associated with the pixel cell. None of the pixel cells are driven any differently as a result of the Worley reformatting. In contrast, as mentioned above, the claims 1 and 20 clearly contemplate that the claimed *substituting* results in a *modified* set of image data words.

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[11] Worley, column 9, lines 46-50.
[12] Emphasis added.
[13] Emphasis added.
[14] Amended claim 1, emphasis added. Claim 20 recites "the modified set of data words resulting from the substituting."

Accordingly, claims 1 and 20 are not anticipated by Worley.

4. Claims 2-6, 9-10, 15-17 depend from claim 1. In addition, claims 21-25 depend from claim 20. These claims are not anticipated by Worley for the same reason that claims 1 and 20 are not anticipated.

5. According to the Office Action, regarding claims 7, 11, 13, and 26, Worley teaches that "the contiguous pixels whose image data words are substituted precede the image data words for which they are substituted." The source of this teaching is said to be the Worley data planarizer 908. As described with respect to claims 1 and 20, Worley fails to disclose "*substituting* for a selected subset of the set of image data." As Worley fails to disclose that the data word for any pixel is substituted, it likewise fails to disclose any form of relationship, i.e., precede, between substitute and substituted data words.

In addition, although Worley does not teach writing data words to a display in a serial fashion, it would have been obvious to one of ordinary skill, according to the Office Action, to modify Worley to write the data words in serial order. To support the conclusion of obviousness, the Office Action cites the Worley disclosure that "the *data* need not be written . . . in any particular order."[15] This disclosure of "any particular order" makes sense if "data" refers to the individually bits of a data word, as the RMS voltage across the electrodes does not depend on the order in which pulses are arranged. For instance, in the Worley example described above it does not matter which intervals the 10 pulses are high so long as there are 10 high pulses in the 15 possible intervals. However, one of ordinary skill in the art would not understand "*data*" in this disclosure to refer to full data words, because of the qualification that "any particular order" is permissible "as long as each *bit* . . . intended for a particular pixel is asserted on that pixel for a portion of the entire *frame time* corresponding to the significance of the asserted bit." Thus, "any particular order" is plainly limited to *bits* asserted within the *frame time* for driving a pixel cell. Thus, Worley does not disclose writing full data words in any

[15] See footnote 7.

particular order. Accordingly, the conclusion of obviousness is not supported by articulated reasoning with rational underpinning.[16]

For these reasons, claims 7, 11, 13, and 26 are not unpatentable over Worley.

6. Claim 8 depends from claim 7, claim 14 from claim 13, and claim 27 from 26. For the same reasons that claims 7, 13, and 26 are not unpatentable over Worley, the claims 8, 14, and 27 are not obvious.

7. Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Worley in view of Aoki. Amended claim 19 depends from amended claim 20, which recites "substituting for a selected subset of the set of image data words the image data words from one or more contiguous pixels." For the reasons given above with respect to claims 1 and 20, Worley fails to disclose "*substituting* for a selected subset of the set of image data." Accordingly, amended claim 19 is not anticipated by or obvious in view of Worley.

[16] "Rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." MPEP 2141, III. See also MPEP 2142, and MPEP 2143.01, IV.

CONCLUSION

Accordingly, claims 1-11 and 13-28 are in condition for allowance. Applicant respectively requests that claims 1-11 and 13-28 be allowed, and this application be passed to issue. Should the Examiner feel that a telephone conference would expedite prosecution of this application, the Examiner is invited to call Applicant's attorney, Richard A. Wilhelm (48,786), at (503) 635-1187.

Respectfully submitted,

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